Workbook Summary

- PAMS data can be used to meet a wide range of objectives.
- Data validation throughout the data analysis process is critical.
- Analysts should perform a range of analyses.
- Data analysis tools are available to facilitate this process.
- Analysts should compare analysis results to achieve consensus.
- Analysts should use other available data sets to supplement and extend analyses such as $PM_{2.5}$ data or special studies data.

PAMS Data Can Be Used to Meet a Wide Range of Objectives (1 of 2)

- Identify when and where ozone precursor concentrations are high.
- Quantify relative contributions of individual species to precursor concentrations and reactivity.
- Identify when and where ozone concentrations are high.
- Determine source contributions.
- Evaluate emission inventories.

PAMS Data Can Be Used to Meet a Wide Range of Objectives (2 of 2)

- Provide data for model inputs.
- Evaluate model results.
- Identify and characterize important meteorological phenomena.
- Estimate response to precursor control.
- Quantify pollutant fluxes into and out of a region.

Compare Results From Different Methods (Achieve Consensus) (1 of 3)

EMISSION INVENTORY EVALUATION

The following ambient data analyses can be used to compare to the emission inventory:

- TNMOC/NO_x ratios
- Hydrocarbon species fractions (e.g., benzene weight percent)
- Hydrocarbon species group fractions (e.g., aromatic hydrocarbon weight percent)
- CO/NO_x ratios
- Spatial and temporal issues (e.g., does the emission inventory temporal distribution accurately reflect the ambient data?)

Compare Results From Different Methods (Achieve Consensus) (2 of 3)

The following source apportionment analyses can be used to compare to the emission inventory:

- Source contribution estimates and source-type identification (e.g., what sources are important)
- Source contribution relationships
- Diurnal patterns
- Spatial and temporal issues

Compare Results From Different Methods (Achieve Consensus) (3 of 3)

TRENDS

For ozone trends, the results of these methods should be compared:

- Indicator species and ratios
- Various meteorological adjustments

For precursors, trends in the following should be assessed:

- TNMOC
- Individual species
- Other indicator species and ratios (e.g., NO_y)
- Various meteorological adjustments

Defining Analysis Objectives (1 of 2)

Decision matrix to be used to identify example activities that will help the analyst address science/technical questions and objectives. To use the matrix, find your technical objective at the top left. Follow this line across to see which example activities will be useful to meet the objective. For each of these activities, look down the column to see which data and data analysis tools are useful for the activity (on the next page).

	APPROACHES, TOOLS																	
	Describe & display spatial & temporal O3 distributions	Describe & display spatial & temporal precursor distributions	Perform climatological, synoptic analyses	Compare surface and upper-air AQ data	Estimate pollutant fluxes	Describe & display met characteristics	Perform case study of met & AQ at strategic sites	Perform trajectory analyses	Compare ambient & emissions ratios, fractions, composition	Interpretative & case study analyses for model input, evaluation	Develop conceptual model	Perform VOC receptor modeling	Apply Smog Production Algorithms	Apply emissions-based models	Develop statistical relationships among pollutants	Characterize reaction chemistry	2D and 3D displays and evaluations	Analysis of model simulation results
SCIENCE/TECHNICAL QUESTIONS/OBJECTIVES																		
O3 concentration distributions	x			x														
Precursor concentration distributions		x		x														
Fluxes into and within region				x	x													x
Meteorological processes				x		x	x											
Climatological patterns			x															
Evaluate Emissions Inventories									x			x						x
Source attribution								x				x						x
VOC sources (natural vs. anthropogenic)												x						x
VOC and/or NOx reduction influence on O3													x	x	x	x		x
Data for model initial, boundary conditions										x								
Air qulaity model evaluation										x	x					x	x	x
Meteorolgical model evaluation										x	x						x	x
Met & AQ phenomena to be reproduced by models											x					x	x	x
Contribution of subregions, outside OTR, carryover											x							x

Defining Analysis Objectives (2 of 2)

Decision matrix continued. This portion of the matrix indicates the useful measurements and tools associated with each example activity.

	APPROACHES, TOOLS: Describe & display spatial & temporal O3 distributions	Describe & display spatial & temporal precursor distributions	Perform climatological, synoptic analyses	Compare surface and upper-air AQ data	Estimate pollutant fluxes	Describe & display met characteristics	Perform case study of met & AQ at strategic sites	Perform trajectory analyses	Compare ambient & emissions ratios, fractions, composition	Interpretative & case study analyses for model input, evaluation	Develop conceptual model	Perform VOC receptor modeling	Apply Smog Production Algorithms	Apply emissions-based models	Develop statistical relationships among pollutants	Characterize reaction chemistry	2D and 3D displays and evaluations	Analysis of model simulation results
MEASUREMENTS																		
Surface																		
O3	x			x			x			x	x		x	x	x	x	x	x
NO, NOx or NOy		x		x			x		x	x	x		x	x	x	x	x	x
NMHC, carbonyls		x		x			x		x	x	x	x	x	x	x	x	x	x
Meteorology			x				x	x	x	x	x			x	x		x	x
Upper-air																		
Meteorology			x		x	x	x			x	x			x	x		x	x
Non-PAMS																		
CO									x	x		x	x		x			x
Emission Inventory									x					x				x
UAM Model Output																		x
Aloft Air Quality	x	x		x	x	x				x	x				x	x	x	x
USEFUL TOOLS																		
AMDAS	✓	✓	✓	✓	✓					✓	✓			✓		✓		
VOCDat		✓								✓	✓					✓		
Other Statistical Methods	✓	✓	✓	✓	✓	✓			✓	✓	✓			✓		✓		
Trajectory Methods				✓	✓			✓		✓		✓		✓			✓	
Factor, cluster analyses						✓						✓			✓	✓	✓	
Advanced factor analyses (e.g., PMF, UNMIX)															✓	✓	✓	
CMB																✓	✓	
SPECIATE														✓	✓	✓	✓	✓

PAMS DATA CAN BE USED TO MEET A WIDE RANGE OF OBJECTIVES